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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,630	04/17/2001	Seiichi Izumi	450117-03190	7212

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FROMMER LAWRENCE & HAUG
745 FIFTH AVENUE- 10TH FL.
NEW YORK, NY 10151

EXAMINER	
MACE, BRAD THOMAS	
ART UNIT	**PAPER NUMBER**
2663	

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/836,630	IZUMI, SEIICHI	
	Examiner	Art Unit	
	Brad T. Mace	2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 April 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The word "means" is used on lines 2, 4, and 7 of the abstract.

2. The abstract of the disclosure is objected to because on line 6, "an" should be replaced with "and". Correction is required. See MPEP § 608.01(b).

3. The disclosure is objected to because of the following informalities:

The specification should contain section titles such as "Background of the Invention", "Summary of the Invention", "Brief Description of the Drawings", and "Detailed Description".

On pg. 1, line 15, "ration" should be replaced with "ratio".

On pg. 2, line 6, "optimise" should be replaced with "optimize".

On pg. 2, line 23, "form" should be replaced with "from".

On pg. 2, line 25, "characterised" should be replaced with "characterized".

On pg. 2, lines 34-35, "be" is missing between "to" and "phase".

On pg. 3, line 4, "signal" should be replaced with "signals".

On pg. 7, line 16, "then" should be removed.

On pg. 7, line 27, "centre" should be replaced with "center";

line 27, "adjustement" should be replaced with "adjustment".

On pg. 7, line 32, "centre" should be replaced with "center".

Appropriate correction is required.

Drawings

4. Figure 8 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claims 1, 5, 12, 14, and 16 are objected to because of the following informalities:

In claim 1, line 11, "for each antenna element (2,3)" should be placed between "transmission" and "with".

In claim 1, line 13, "adjustes" should be replaced with "adjusts".

In claim 5, line 4, "the" should be removed before the word "phase".

In claim 12, line 3, "the" should be removed before the word "phase".

In claim 12, line 4, "elements" should be replaced with "element".

In claim 14, line 3, "the" should be removed before the word "time".

In claim 16, line 3, "the" should be replaced with the "a".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 5, 6, 7, 9, 12, 13, 14, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,763,225 (Farmine et al.) in view of U.S. Patent No. 6,807,145 (Weerackody et al.).

Regarding claims 1, 2, 7, 9, 17:

Farmine et al. discloses a transmission diversity device and method (where any method can applied to a computer program), having:

a plurality of antenna elements (Figure 4, references 2, 3),

a plurality of processing devices respectively connected to one of the antenna elements (col. 2, lines 50-55),

phase comparison and adjustment means for comparing phases of signals received at the antenna elements and for adjusting the phases of signals transmitted by the antenna elements according to the result of the comparison (Figure 4, reference 10, and col. 4, lines 58-67 through col. 5, lines 1-7).

However, Farmine et al. does not disclose expressly that the transmission diversity device is designed for a (OFDM) multicarrier transmission and compares the phases of at least one subcarrier of the multicarrier transmission with the phase of at least one subcarrier of at least one other antenna element and adjusts it subsequently for transmission.

Weerackody et al. discloses an OFDM multicarrier transmission diversity system (Figure 2A).

A person of ordinary skill in the art would have been motivated to employ Weerackody et al. in Farmine et al. in order to obtain an OFDM transmission diversity system. At the time the invention was made, therefore, it would have been obvious to combine Weerackody et al. in Farmine et al. (collectively Farmine et al.-Weerackoday et al.) to obtain the invention as specified in claims 1 and 2. The suggestion motivation to do so would have been to obtain a diversity transmission system that can phase adjust multicarrier (OFDM) signals, where the multicarrier signals comprise of subcarriers that could be phase adjusted in the same manner as the communication signals in Farmine et al.

Regarding claims 5, 12:

Farmine et al. further discloses that the device comprises the function of frequency adjusting the phase differences of the subcarriers (communication signals) received respectively at one antenna element (col. 4, lines 65-67 through col. 5, lines 1-7).

Regarding claims 6, 13:

Farmine et al. further discloses that the device comprises the function of comparing only predetermined subcarriers (communication signals) of different antenna elements (Figure 4, references 2, 3, and col. 2, lines 50-59, where the expected (predetermined) communication signals from mobile stations are received at different antennas).

Regarding claim 14:

Farmine et al. discloses substantially all the claimed modified invention as specified above, however, does not disclose expressly correlating the time domain data.

Weerackody et al. discloses generating an orthogonal signal in the time domain suited for data transmission.

A person of ordinary skill in the art would have been motivated to employ Weerackody et al. with Farmine et al. in order to obtain a transmission diversity device that correlates time domain data. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Weerackody et al. in Farmine et al. (collectively Farmine et al.-Weerackody et al.) in order to obtain the invention as specified in claims 7 and 14. The suggestion/motivation to do so would have been to obtain a transmission diversity device that compares the phase of time domain data since a transmission diversity can transmit and receive time domain data.

Regarding claim 16:

Farmine et al. further discloses that the device can be applied in the base station of a wireless transmission system (Figure 4, reference 1 and col. 4, line 44).

8. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,763,225 (Farmine et al.) in view of U.S. Patent No. 6,070,056 (Sakoda et al.).

Regarding claims 3, 10:

Farmine et al. discloses substantially all the claimed modified invention as specified above, however, does not disclose expressly that the device comprises a subcarrier phase comparison dependent amplitude adjustment function.

Sakoda et al. discloses an amplitude-phase correction circuit for ODFM wave (multi-carrier signals) (see Figure 7, and col. 5, lines 16-22, amplitude and phase are both corrected and since they are of the same component, they are dependent on each other).

A person of ordinary skill in the art to which the invention pertains would have been motived to employ Sakoda et al. in Farmine et al. in order to obtain a transmitting device that corrects for amplitude deviations. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Sakoda et al. in Farmine et al. (collectively Farmine et al.-Sakoda et al.) to obtain the invention as specified in claims 1 and 3 and in claims 7 and 10. The suggestion/motivation to do so would have been to correct amplitude deviations so that information contained in the multi-carrier signal is transmitted accurately and hence favorable communication can be conducted (Sakoda et al., col. 5, lines 46-53).

9. Claims 4, 8, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,763,225 (Farmine et al.) in view of U.S. Patent No. 5,970,397 (Klank et al.).

Regarding claims 4, 8, 11:

Farmine et al. discloses substantially all the claimed modified invention as specified above, however, does not disclose expressly that the device comprises a function of averaging the phase differences of a plurality of subcarriers respectively received at one antenna element.

Klank et al. discloses a method for the frequency correction of multicarrier signals where the frequency deviation is estimated by averaging the phase variation (col. 3, lines 19-54, where comparing the frequency deviation is repeated yielding an average value since the estimate frequency deviation value is fed-back through the device as shown in Figure 2).

A person of ordinary skill in the art to which the invention pertains would have been motived to employ Klank et al. in Farmine et al. in order to obtain a transmission device that averages phase variation. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Klank et al. in Farmine et al. (collectively Farmine et al.-Klank et al.) in order to obtain the invention as specified in claims 1 and 4, in claim 7, and in claims 7 and 11. The suggestion/motivation to do so would have been to average the phase variations so as to obtain a better (more accurate) estimate of the phase differences between subcarriers.

10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,763,225 (Farmine et al.) in view of U.S. Patent No. 6,700,865 (Yamamoto et al.).

Regarding claim 15:

Farmine et al. discloses substantially all the claimed invention as specified above, however, does not disclose expressly in case it is detected that at any of the antenna elements no signal or a signal with an amplitude below a predetermined threshold is received, the antenna element is not used for a transmission.

Yamamoto et al. discloses that the reception level of each antenna determines whether transmission of the signal of the respective antenna is to be transmitted through the ON/OFF switch (col. 3, lines 65-67 through col. 4, lines 1-12, where the reception level (amplitude level) must exceed a predetermined threshold value in the ON/OFF switch, and where no signal for an antenna is therefore below the predetermined threshold value, hence antennas with reception levels below a threshold are not used to pass transmission of the signal).

A person of ordinary skill in the art to which the invention pertains would have been motived to employ Yamamoto et al. in Farmine et al. in order to obtain a device that uses only the transmission of signals through a device from received signals having a desired reception (amplitude) level. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Yamamoto et al. in Farmine et al. (collectively Farmine et al.-Yamamoto et al.) in order to obtain the invention as specified in claims 7 and 15. The

suggestion/motivation to do so would have been to have signals with an excellent reception state so as to improve the anti-multi-path fading characteristic (Yamamoto et al., col. 4, lines 10-12).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brad T. Mace whose telephone number is (571) 272-3128. The examiner can normally be reached on Monday -Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau Nguyen can be reached on (571) 272-3126. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

btm

Brad T. Mace
Examiner
Art Unit 2663

btm
October 28, 2004

CHAU NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600